ABOUT THE NEW MADRID FAULT

The New Madrid Fault System Extends 120 Miles Southward from the area of Charleston, Missouri, and Cairo, Illinois, through New Madrid and Caruthersville, following Interstate 55 to Blytheville and on down to Marked Tree, Arkansas. It crosses five state lines and cuts across the Mississippi River in three places and the Ohio River in two places.

The Fault is Active, Averaging More than 200 Measured Events per Year (1.0 or more on the Richter scale), about 20 per month. Tremors large enough to be felt (2.5 – 3.0 on the Richter scale) are noted annually. Every 18 months the fault releases a shock of 4.0 or more, capable of local minor damage. Magnitudes of 5.0 or greater occurring about once per decade can do significant damage and be felt in several states.

The Highest Earthquake Risk in the United States outside the West Coast is along the New Madrid Fault. Damaging temblors are not as frequent as in California, but when they do occur, the destruction covers over more than 20 times the area because of underlying geology.

A Damaging Earthquake in this Area, 6.0, reoccurs about every 80 years (the last one in 1895). In 2002, the U.S. Geological Survey released new earthquake probabilities for the New Madrid Seismic Zone. For a magnitude 6.0 – 7.5 or greater earthquake, there now is estimated to be a 25-40% chance in 50 years. The results would be serious damage to schools and masonry buildings from Memphis to St. Louis.

A Major Earthquake in this Area - the Great New Madrid Earthquake of 1811-12 was actually a series of over 2000 shocks in five months, some of 7.6 intensity and five of which were 8.0 or more in magnitude. Eighteen of these rang church bells on the Eastern seaboard. The very land itself was destroyed in the Missouri Bootheel, making it unfit even for farming for many years. It was the largest burst of seismic energy east of the Rocky Mountains in the history of the U.S. and was several times larger than the San Francisco quake of 1905.

When Will Another Great Earthquake Happen the Size of Those in 1811-12? Several lines of research suggest that the catastrophic upheavals like those in 1811-12 visit the New Madrid region every 500-600 years. Hence, emergency planners, engineers, and seismologists do not expect a repeat of the intensity of the 1811-12 series for at least 100 years or more. However, even though the chance is remote, experts estimate the chances for a repeat earthquake of similar magnitude to the 1811-1812 New Madrid earthquakes have changed from the1985 estimates of 2.7 – 4.0% probability in 50 years to a 7 - 10% probability. This is a result of new evidence of shorter recurrence intervals identified from pre-historical events. Earthquake probabilities for known active faults always increase with time, because stresses within the earth slowly and inexorably mount, year by year, until the rocks can take no more, and sudden rupture becomes inevitable.

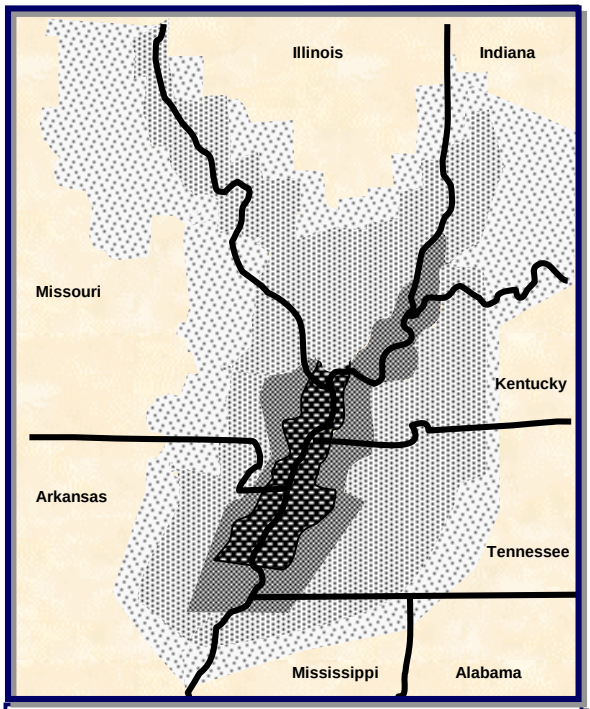
Our Greatest Concerns are the 6.0-7.6 Sized Events, which do have significant probabilities in the near future. Damaging earthquakes of this magnitude are very likely within the lifetimes of our children.

What Can Be Done to Protect Ourselves? Education, planning, proper building construction, and preparedness are proven means to minimize earthquake losses, deaths, and injuries. In recent memory, San Francisco and Armenia both experienced 6.0-7.1 magnitude quakes. San Francisco was prepared; Armenia was not. San Francisco suffered 67 deaths and less than $7 billion in property losses. Armenia had over 25,000 deaths and lost more than $20 billion. More recently, Alaska underwent a 7.9 earthquake. Losses were minimized in this event because the epicenter was in a remote location. Missouri and the Midwest are more prepared than Armenia, but only partly as prepared as San Francisco, and the epicenter is not likely to be in a totally isolated area.

What is the Richter Scale? The Richter scale of earthquake magnitude is a measure of the energy released at the source of an earthquake deep within the earth. It is determined by measuring the amplitudes of ground motion on seismograms. An earthquake has a fixed amount of energy and only one Richter magnitude.

How Much Increase in Energy Does Each Unit of the Richter Scale Represent? It is incorrect to say that each unit of the Richter scale corresponds to a tenfold increase in energy. Each unit, say from 5.2 to 6.2, actually represents 31.6 times difference in energy release. Every two units represent 1,000 times more energy, and every two-tenths of a unit represents double the energy.

If a Fault Has Lots of Little Earthquakes, Will Larger Ones Be Prevented? The answer is, "No". A magnitude 6.0 (which is damaging) is 1,000 times more energy than a 4.0 (which is not damaging). An 8.0 (which is devastating) is 1,000 times larger than a 6.0. In other words, a fault would have to have 1,000 4.0 events to prevent the occurrence of a single 6.0, or a million 4.0 events (1,000 times 1,000) to prevent a single 8.0.



The New Madrid Fault is a complex zone of seismically active fractures in bedrock buried several thousand feet beneath river sands and mud. An earthquake's severity is greatest at its focal point, known as the epicenter, but lessens as the distance from the epicenter increases. The hachured areas on the map above show possible damage levels of a 7.6 earthquake event. The darkest area on the map portrays an epicenter, potentially the area of greatest damage.

We Have a Choice. While we still have time, we can get ready and cut our losses, or we can do little or nothing and be caught unprepared. We cannot prevent the coming of an earthquake – it will happen – but we can prevent it from being a major disaster. Write the Missouri State Emergency Management Agency or call (573) 526-9100 for free literature on protecting yourself and your property.

(SEMA's January 2003 revision of a fact sheet formerly distributed by the Southeast Missouri State University's Center for Earthquake Studies.)